Syphilis Seroconversion and Reinfection among Individuals Entering Baltimore City Booking and Intake Center 1998 - 2004

Rosemary Nabaweesi
Amy Winkler
Treponema pallidum

- Organism that causes syphilis
- Gram negative spirochete
- Strictly human pathogen
Stages of Syphilis

- **Primary infection** – ulcer or chancre at the site of infection; vulva, vagina or penis
  - Chancre on lower lip

- **Secondary infection** – skin rash, mucocutaneous lesions and lymphadenopathy
  - Secondary syphilis lesions on back

- **Tertiary infection** – cardiac, ophthalmic, auditory abnormalities and gummatous lesions
  - Buboe of neck

http://euclid.dne.wvfbernet.net/~jvg/Bio208/Urogen_pix/Syphilis.html
Stages of Syphilis
Latent Infection

Absence of clinical manifestation

- Early latent infection — known exposure within the last year
- Late latent infection — exposure is unknown or greater than a year
Syphilis Testing

Serologic tests for the diagnosis of Syphilis with this population:

1. **Nontreponemal tests** – (these tests are associated with a high rate of false positive related to other disease conditions)
   a) Venereal Disease Research Laboratory (VDRL)
   b) Rapid Plasma Reagin (RPR)

2. **Treponemal tests**
   a) Fluorescent treponemal antibody absorbed (FTA-ABS)
   b) T. pallidum particle agglutination (TP-PA)
Treatment

Benzathine penicillin G 2.4 million units IM in a single dose

Patients (non-pregnant) with penicillin allergy can be treated with:

- Doxycycline 100 mg PO BID
- Tetracycline 500 mg PO QID
Syphilis – in Baltimore

In 1998 the City of Baltimore had 27 times the national average of new cases of syphilis, which ranked it 1st in the nation. Progress has been made, and in 2002 Baltimore City ranked 11th in the nation for all types of syphilis and 5th for primary and secondary syphilis, representing a reduction from 466 to 121 new cases. While there has been a significant reduction in the total number of cases identified in Baltimore, the incidence of syphilis remains high. This is especially evident in the prison population in Maryland. According to the CDC, 9.5% of women and 3.3% of men entering the juvenile and adult correction facilities in 2002 were seroreactive for syphilis.
Objectives

- To clean & relate the Stat lab database records
- To link the Stat lab records to the STDMIS database
- Conduct data analysis on seroconversion and reinfection
- Publish results
Rationale

1. According to CDC, syphilis rates in Baltimore are rising (17% increase among men and 51% increase among women from 2002-2003)

2. Syphilis, being a GUD increases by 3-to 5-fold the risk of transmitting and acquiring HIV

3. Screening & treatment programs in jails offer a unique public health opportunity to interrupt community transmission

4. By facilitating treatment of high risk individuals before their release, who otherwise might not receive health care services in traditional settings
Baltimore City Booking & Intake Center

• Is part of the Division of Pretrial & Detention services in Maryland Dept of Public Safety & Correctional Services

• The Baltimore City Detention Center is the 18th-largest correctional institution in the country, admitting more than 43,000 people a year.
BCBIC is made up of 5 facilities

- Women’s Detention Center (BWDC)
- Central Booking & Intake Facility (CBIF)
- Baltimore City Detention Center (BCDC)
- MD Reception, Diagnostic & Classification Center (MRDCC)
- Metropolitan Transition Center (MTC)
Stat Lab

- More than 20,000 admissions annually
- Consists of CBIF (Central Booking and Intake Facility) plus 4 other facilities
- ~50-60% of arrestees are released
- Mandatory medical check ups if detained for = >14 days
- Reactors’ data entered into the State STD*MIS system
STD*MIS

- Consists of statewide syphilis reactors
- With the following information:
  - Interview record; Risk factors, Signs & symptoms, Diagnosis
  - Field records; Contacts, Referral basis (thru’ partner, cluster or +ve lab test) Treatment
  - Syphilis Serology Report
Methodology

- Link StatLab to STDMIS database
- A new ID (PHASE ID) was given to all matching records.
- Fields used to consolidate >156,000 records were: last name, first name, gender, DOB, SSN, and HARS ID
- Consolidation was based on matching all fields except one or two
Definition of Re-infection

• The CDC states that successful treatment is indicated by a four-fold decrease in the RPR baseline titer from time of treatment should be considered a successful.

• We consider an individual re-infected if he/she was successfully treated and later shows at least a four-fold increase from the post-treatment titer.
Preliminary Results
General and demographics

- A new patient ID is generated every time an individual changes or modifies their names or DOBs
- HARS ID (CJID linked to finger printing) remains the same
- 84,582 “individuals” (unique patient IDs) entered the correctional system during the study period
Demographics Cont…

- 72,006 unique Phase IDs assigned after matching
- 12,576 aliases or modified DOB used by 9,850 detainees (ranged from 2-9, median 2)
- 72% males, 28% females, almost 100% unknown race/ethnicity
- 53% of males and 45% of females between 30-39 years of age
Results of the Seroconverted

1. 150,772 RPR performed, 8% positives
2. 5,460 FTA-ABS performed, 78% positives
3. Out of 31,616 individuals with at least 2 tests (initial test being negative) 0.2% eventually seroconverted
4. Positivity rate was 5.8% (4206/72,006) FTA confirmed
5. 59% of these were male
6. 22% (seroconverted) reported one or more risk factors
7. Females made up 37% of this group
## Risk Factor Distribution by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Drug User</th>
<th>Hetero Sex</th>
<th>Sex HIV</th>
<th>Sex $/ Drug</th>
<th>Sex Female</th>
<th>Sex IVD U</th>
<th>Sex Male</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Results Cont...

1. Among the females, 60% reported having had sex for drugs or money as well as having had sex with men and HIV infected people.
2. Among the males 67% reported having had sex with a female, while 33% reported having had sex for drugs or money and being a drug user.
3. 39% of the seroconverted were diagnosed, and 64% of these were male.
Results...

4. **Males:**
   a) 31% had primary syphilis
   b) 25% early latent
   c) 13% had HIV but not diagnosed for syphilis
   d) One individual was diagnosed with gonorrhea & secondary syphilis, while another one had gonorrhea and Chlamydia

5. **Females:**
   a) 63% were diagnosed with early latent
   b) One individual was diagnosed secondary & early latent syphilis
Status of the Re-infection Group

• 4,738 treatments given to 3609 “individuals”
• 1,064 responded to the treatment
• 546 of these had another titer after the 4-fold decrease
• It was determined that 91 of these were re-infected
Demography

1. Females:
   a) Made up 67% of the group
   b) 58% were between 25 & 34 yrs

2. Males:
   a) 43% were bet 30&39 yrs of age

• 80% penicillin treatments and 20% others (doxycycline or tetracycline)
• Analysis of linked data of re-infected group is still on-going
Challenges

1. Most individuals being booked enter the BCBIC several times
2. The size of the databases
3. Reliability of the data
   - Majority falsify names, SSN and DOB
   - Significant data entry errors were found especially with the HARS ID (CJIS fingerprint)
4. Subjective choices used during data cleaning
## StatLab Example

<table>
<thead>
<tr>
<th>First</th>
<th>Last</th>
<th>Gender</th>
<th>DOB</th>
<th>HARS-ID</th>
<th>SSN</th>
</tr>
</thead>
<tbody>
<tr>
<td>John</td>
<td>Doe</td>
<td>M</td>
<td>2/2/67</td>
<td>123456</td>
<td>123-45-6789</td>
</tr>
<tr>
<td>Joe</td>
<td>Doe</td>
<td>M</td>
<td>2/2/67</td>
<td>123456</td>
<td></td>
</tr>
<tr>
<td>Doe</td>
<td>Joe</td>
<td>M</td>
<td>2/22/67</td>
<td>123456</td>
<td>123-45-6789</td>
</tr>
<tr>
<td>Jon</td>
<td>Doe</td>
<td>M</td>
<td>12/2/66</td>
<td>123456</td>
<td>123-45-6789</td>
</tr>
<tr>
<td>Joey</td>
<td>Doewy</td>
<td>M</td>
<td>2/2/68</td>
<td>123456</td>
<td></td>
</tr>
<tr>
<td>John</td>
<td>Does</td>
<td>M</td>
<td>2/2/67</td>
<td>123457 (VE)</td>
<td></td>
</tr>
<tr>
<td>John</td>
<td>Doe</td>
<td>M</td>
<td>2/2/67</td>
<td>123456</td>
<td></td>
</tr>
<tr>
<td>Jon</td>
<td>Doe</td>
<td>F (VE)</td>
<td>2/2/67</td>
<td>123456</td>
<td>123-45-6789</td>
</tr>
</tbody>
</table>

*VE = verified error of data entry by phone call to StatLab*
Recommendations

1. Funding for IVDU interventions should be increased in order to reach these core groups.
2. Heterosexuals, just like MSMs, need to be counseled about the likelihood of catching STIs including HIV.
3. Screening and treatment programs for STIs should be intensified in the Baltimore City area.
Acknowledgement

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